

IMPLEMENTING A NATIONAL DATABASE ON YOUNG CHILDREN'S LEARNING: A PRELIMINARY ANALYSIS OF A LONGITUDINAL STUDY TO EVALUATE THE QUALITY OF PRESCHOOLS

Ching-Ching Cheng , Shan-Shan Cheng 

National Chiayi University, Taiwan

E-mail: chingching_cheng@mail.ncyu.edu.tw, medusa33tw@hotmail.com

Abstract

In recent years, many policies have been formulated and strongly promoted to improve the quality of early childhood education. In 2012, the Taiwanese government enacted a new national curriculum framework for early childhood education to enhance the quality of early childhood education programs. This new framework is key competence-oriented, meaning preschool educators must focus on children's learning and inquiry processes when designing the curriculum. A series of projects collecting information on the quality of the learning environment and learning outcomes of children aged 2 to 9, called the Early Childhood Learning Database, was built to understand the effectiveness of the curriculum reform. As a longitudinal study, young children's learning is long-term tracked and analyzed to understand the authentic situation and relevant factors to form a policy for optimizing education quality. The preliminary analysis confirmed the positive influence of the new curriculum.

Keywords: *early childhood education, curriculum reform, learning database, quality of preschools*

Introduction

There is a consensus that early childhood education is an essential cornerstone for talent cultivation because early development is the foundation of individual development. In recent years, empirical research has found that the quality of early childhood education will not only affect the learning outcomes in the early childhood education stage, but the influence will continue to follow-up stages: primary school, middle school, and even university (Amadon et al., 2022; Ulferts et al., 2019). To cultivate young people's talents, effective investment of resources in early childhood education is being implemented and undergoing by the government now. Nevertheless, how resources should be allocated requires accurate information as a basis for decision-making, especially the complexity and specificity of early childhood education sites need to be carefully considered (Chen & Li, 2022; Eckhardt & Egert, 2018; Mitchell et al., 2015; Mitchell et al., 2016).



This is an open access article under the
Creative Commons Attribution 4.0
International License

Research Focus

Education has always been highly valued in Taiwan's culture. In recent years, due to the increased understanding of the importance of early childhood education, many policies have been formulated and strongly promoted to improve the quality of early childhood education.

In 2012, the Taiwanese government enacted a new national curriculum framework for early childhood education to enhance the quality of early childhood education programs. This new framework was called Early Childhood Education & Care Curriculum Framework (ECECCF), which is key competence-oriented (Chang et al., 2012). It means preschool educators must focus on children's learning and inquiry processes when designing the curriculum (Shing et al., 2017). This key competence-oriented curriculum helps children develop the knowledge, attitudes, and skills to adapt to life and future challenges. ECECCF aims to develop children's six key competencies: Awareness & Identification, Expression & Communication, Concern for Others & Collaboration with Others, Reasoning & Appreciation, Imagination & Creativity, and Self-Regulation.

Moreover, for a better implementation of ECECCF, the Ministry of Education (MOE) has run the on-site consulting program since 2013. The preschool invites a consultant; a consulting project usually lasts for a year; the consultant meets with the preschool educators monthly. Mentoring, observing in the classroom, and discussing curriculum development with the educators in the preschool were used by consultants to help educators better understand and implement ECECCF. Therefore, researchers and the government need to understand the quality of early childhood education and the effectiveness of the on-site consulting program under this new curriculum framework.

Faas and Dahlbheimer (2021) indicated that quality and its definition were the main issues before a government could monitor quality. Therefore, the meaning of quality in early childhood education should be discussed. OECD (2018) defined that the early childhood education and care (ECEC) quality can be distinguished between structural characteristics and process quality. Different methods should be implemented for measuring the level of these two parts of ECEC quality. Zukani and Ganqa (2022) also argued that quality could be viewed from various perspectives, including input of process (curriculum process implementation and reform) and results (development status and learning of children). All these aspects of ECEC quality need to be considered besides the contents of ECEC quality, how to evaluate it, and from whose perspectives should be considered. Because the concepts and perceptions of quality management are time-changing and culture-dependent, researchers should consider the views of all key groups (Heikka, et al., 2021). There is no nationwide database of early childhood education in Taiwan. Therefore, the main issue of this study was to build a database collecting system for tracking down different aspects of ECEC quality in Taiwan under the new curriculum framework.

Research Questions

1. What are the problems and solutions while implementing the database?
2. What are the preliminary results of analyzing children's learning and development using this database?

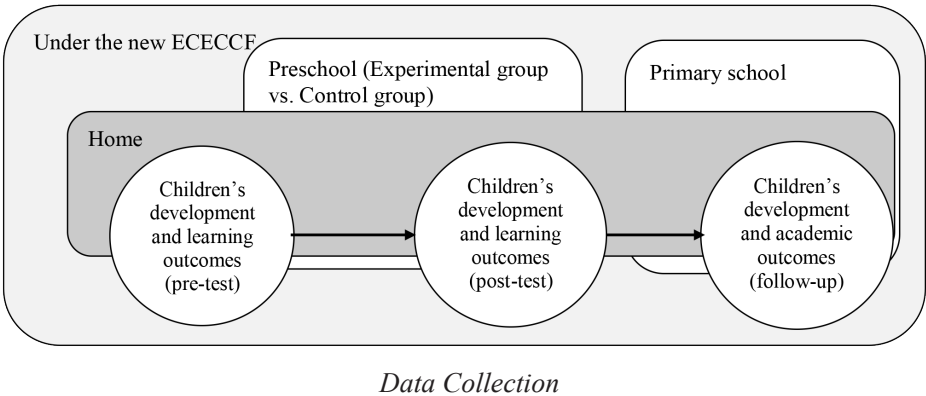
Research Methodology

General Background and Database Design

Since 2014, the MOE in Taiwan has launched a series of projects to build a pre-school learning database. An essential task in the early stages of the database is to identify the purpose of this database, such as understanding the current state of education, policy effectiveness analysis, or improvement of the teaching environment. Furthermore, based on the purpose, researchers could decide which specific data should be included in the database for further investigation.

The first step of this study was to call for meetings. MOE officials, preschool and primary educators, and researchers in early childhood education and primary education were invited to determine the database's sample selection and data content. The final decision was to collect data on the quality of the learning environment and the development and learning achievement of children aged 2 to 6 with multiple evaluation tools. Then, to follow the children until the third grade. As a longitudinal study, young children's learning is long-term tracked and analyzed to understand the authentic situation and relevant factors to form a policy for optimizing education quality. The structure of the database design is presented in Figure 1.

Figure 1
The Structure of Database Design



A total of 2,335 children aged 2 to 6 in 178 classrooms were recruited during 2017-2018. For future comparative studies, several preschool features were marked to investigate the relationship between these features and children's learning progress. These features included participation in the ECECCF consulting program, school area, a public or private institution, and children's enrolling ages.

For the reliability of the data, the training programs for examiners were held before the data-collecting period each semester. The training programs consisted of research ethics, instrument operation, and on-site practice, and the person who passed the final test could participate in data collection.

Instruments

Several evaluation tools were chosen to collect data from three main aspects: children's development and learning outcomes, school and home environment, and the level of ECECCF implementation.

Children's development and learning outcomes. Data was initially collected during preschool to understand children's development and learning outcomes. Cognitive development, language development, and learning outcomes (six key competencies) were evaluated. Children's development and learning outcomes were measured in the first semester(pre-test) and followed up every year(post-test). After enrolling in primary school, children's cognitive development, language development, school behaviors, and subject content of mathematics and language were tested yearly for tracking. Children's learning outcomes and school behaviors were evaluated by children's teachers. Researchers or well-trained testers held developmental tests and academic tests.

School and home environment. The school environment part was evaluated from multiple aspects. Data on the organizational atmosphere, partnerships at preschools, the quality of the learning environment, and several structural characteristics, including child-staff ratio, group size, and staff education, were collected. Data were collected through preschool and elementary teachers and well-trained observers' questionnaires. Home environment, parent-teacher cooperation, and other characteristics, like parents' education level, home language, and the number of children, were collected by questionnaires.

The level of ECECCF implementation. In response to the curriculum reform in Taiwan, a research instrument was developed to measure the effectiveness of the preschool teachers' ECECCF implementation (Chang, et al., 2021) during the second semester of each school year. The ECECCF Implementation Scale obtained four subscales with 19 items: Awareness and Adjustment, Learning Centers Arrangement, Teaching Guidance and Curriculum Development. Well-trained researchers observed each classroom from 7:30 to 14:00 and then interviewed the principal teacher of the classroom to rate the level of ECECCF implementation.

All data were coded after collecting and double-checked by different people. Statistical procedures were used to examine the validity and reliability of each characteristic. Furthermore, in this study, T-test, ANOVA, and correlations were used to examine the effectiveness of different levels of ECECCF implementation and children's learning outcomes between the preschool stage and primary school stage.

Results and Discussion

As a national database of early childhood education, the sample size is large and widely distributed throughout the country. Moreover, as a longitudinal study, this database was designed to collect consecutive six-year data. Data was collected from different keyholders, including children, educators of preschools and primary schools, and results from different tools and methods used. These designs aimed to obtain reliable and valuable data for further analysis but made the task more difficult.

Problems and Solutions

Many problems were encountered during the recruiting stage. Because of the high standards of research ethics regulation and people's awareness of personal data protection, the data collection process initially encountered difficulties in sample invitation. To maximize the sample numbers and reduce the dropping rate during the longitude survey, the research team adopted various strategies at the beginning and continuing periods. To increase the participation rate of the invited samples, the project team adopted multiple methods to reduce parents' and teachers' concerns, including preschool visits to hold information sessions and assisting promotion by local government, project websites, and network societies. To decrease the dropping of research participants, the research team made efforts to meet participants' needs from their feedback. For example, after confirming the willingness to participate, the project team would directly contact parents by providing child test results, parenting advice, and gifts for children entering a school and establishing a mutual trust preventing them from dropping out.

Another unexpected issue during the process of data collection was the pandemic. During the year 2020 to 2022, the pandemic impacted children's learning and data collecting process of this study. Since January 2020, Taiwan has limited outsiders' access to campuses and has conducted several periods of online teaching. The data collection schedule has been adjusted accordingly. For example, reschedule all testing staff to enter schools for testing during the short face-to-face teaching periods and continue to contact parents and teachers through mailing questionnaires during the online teaching period. However, these strategies demanding flexible human resources management and extra funds, require more resources.

Preliminary Research Results

The research findings were just from rough analyses, but the results were enlightening. The purpose of enacting the new curriculum framework was to improve the quality of early childhood education, and children's learning outcomes were one of the quality indicators. The data of this study presented positive results on the effectiveness of the new curriculum framework. Children in the higher level of ECECCF implementation classroom performed better in the six key competencies. Moreover, these abilities of six key competencies were correlated to their academic learning outcomes and further development. ECECCF provided a clear guideline for educators to create an appropriate learning environment, observe and understand children and interact with children better (Chang et al., 2012). This study showed that all of these efforts improve children's learning outcomes.

Conclusions and Implications

Establishing a database of early childhood learning is conducive to academic research and can be an essential basis for government decision-making. Databases for different purposes can provide multiple aspects for improving the quality of early childhood education. The number of databases for early childhood education needs to be increased. However, the resources for establishing a database are enormous. From the design to the implementation, a meaningful database is time, human resource, and money-consuming.

Moreover, a recent study noticed that the concepts and perceptions of quality management are time-changing (Heikka, et al., 2021). A database's purpose and contents need to be adjusted from time to time. Our experience building a database shows that a long-term tracking database is more challenging to build and maintain. In addition to providing support and resources, the government can encourage researchers across borders to share and cooperate, making the process and results of building a national database more fruitful. The government could make better decisions and policies based on the results and reach the goal of enhancing the quality of early childhood education.

Acknowledgments

This project is financially supported by the Ministry of Education, Taiwan.

Declaration of Interest

The authors declare no competing interest.

References

- Amadon, S., Gormley, W. T., Claessens, A., Magnuson, K., Hummel-Price, D., & Romm, K. (2022). Does early childhood education help to improve high school outcomes? Results from Tulsa. *Child Development*, 93(4), 379-395. <https://doi.org/10.1111/cdev.13752>
- Chang, C. W., Cheng, S. S., Chang, I. W., Liaw, F. R., & Cheng, C. C. (2021). The development of the "Early Childhood Education and Care Curriculum Framework Implementation Scale" in Taiwan. *Hungarian Educational Research Journal*, 11(4), 377-395.
- Chen, J. J., & Li, H. (2022). Tian shi (timing) di li (context) ren he (human capital): A new theoretical framework for analyzing the implement ability of imported early childhood practices and making a case for a hybrid model. *Journal of Research in Childhood Education*. <https://doi.org/10.1080/02568543.2022.2107588>
- Eckhardt, A. G., & Egert, F. (2018). Process quality for children under three years in early childcare and family childcare in Germany. *Early Years*, 40(3), 287-305. <https://doi.org/10.1080/09575146.2018.1438373>
- Faas, S., & Dahlheimer, S. (2021). Quality monitoring in day care centers and preschools: Discourses, concepts and experiences from German early childhood education and care. In S. Garris & H. L. Taguchi (Eds.), *Quality Improvement in Early Childhood Education: International Perspectives on Enhancing Learning Outcomes* (pp. 163-180). Palgrave Macmillan.
- Heikka, J., Fonsen, E., Mantjarvi, M., Kiuru, L., Suhonen, K., & Keikonen, L. (2021). Evaluating quality in Finnish early childhood education. In S. Garris & H. L. Taguchi (Eds.), *Quality Improvement in Early Childhood Education: International Perspectives on Enhancing Learning Outcomes* (pp. 21-44). Palgrave Macmillan.
- Mitchell, L., Cowie, B., Clarkin-Phillips, J., Davis, K., Glasgow, A., Hatherly, A., Rameka, L., Taylor, L., & Taylor, M. (2015). *Continuity of early learning: Learning progress and outcomes in the early years overview report on data findings*. Report to the Ministry of Education of New Zealand. https://www.educationcounts.govt.nz/_data/assets/pdf_file/0005/163589/Continuity-of-Early-Learning-Learning-Progress-and-Outcomes-Overview-Report.pdf
- OECD. (2018). *Starting Strong: Engaging Young Children: Lessons from Research about Quality in Early Childhood Education and Care*. <https://www.oecd.org/education/engaging-young-children-9789264085145-en.htm>

- Shing, M. L., Chou, Y. P., Wang, S. F. & Hsu, S. L. (2017). The key competence-oriented curriculum design and practices in preschools. *The Elementary Education Journal*, 64(4), 4–29.
- Ulferts, H., Wolf, K. M. & Anders, Y. (2019). Impact of process quality in early childhood education and care on academic outcomes: Longitudinal meta-analysis. *Child Development*, 90(5), 1474–1489. <https://doi.org/10.1111/cdev.13296>

Received: April 14, 2023

Accepted: May 16, 2023

Cite as: Cheng, C.-C., & Cheng, S.-S. (2023). Implementing a national database on young children's learning: A preliminary analysis of a longitudinal study to evaluate the quality of preschools. In V. Lamanauskas (Ed.), *Science and technology education: New developments and Innovations. Proceedings of the 5th International Baltic Symposium on Science and Technology Education (BalticSTE2023)* (pp. 58-64). Scientia Socialis Press. <https://doi.org/10.33225/BalticSTE/2023.58>